

value of the timer is reset (S300). The result of the operation for seeking the distance and the direction to the target position (S201) is shown in the display panel 108 (S202), and the wave receiving condition is judged (S203). If the wave receiving condition is not good (S203), the same operation as that of the foregoing embodiment is performed until it is judged whether the user is walking or not (S204).

If the reason why the wave receiving condition is not good is that the user takes an action, the wave receiving operation is temporarily stopped (S205), and the timer is started (S301). When the user's action is continued and the timer reaches a predetermined value, since the moving direction should be confirmed or corrected, the alarm device 109 gives an alarm to urge the user to receive the GPS wave (S207). The period of time from the time when the wave receiving operation is stopped during the walk and the time when the wave is again received is registered by the input circuit 102 in advance.

In the same way as in the foregoing embodiment, even if the constant period of time has not lapsed during the interrupt of the wave receiving operation, in the case where the user has tried to receive the wave, it is judged that the condition is not the walking condition (S204), and the wave is again received. Accordingly, the user may confirm or correct the moving direction at any desired position. The above-described guide operation is repeated. When the user reaches the target position or the guide completion signal is fed from the input circuit 102 to the CPU 104 (S208), the guide operation is completed.

As described above, according to the present invention, since the system is composed of the antenna position detecting means for detecting the wave receiving posture of the GPS receiving antenna, the signal receiving operation controlling means for controlling the signal receiving operation on the basis of the output of the antenna posture detecting means, the GPS receiving means and the received GPS signal processing means controlled by the signal operation controlling means, and the display means for displaying the GPS data outputted from the GPS signal processing means, in the antenna position or posture where it is apparently impossible to receive the wave, it is possible to interrupt the operations of the GPS receiving operating section and the received signal processing section to attain the low power consumption (low current) for the GPS receiver. In accordance to another method, the body movement detecting means, the operation judgement means and the received signal controlling means are provided so that the signal receiving operation is interrupted in the posture where it is very difficult to receive the wave during the user's action to save the power consumption (low current). Also, the alarm means is provided so that the user is urged to receive the wave every time the user advances through a constant distance or every time a constant period of time has lapsed. Accordingly, when the user is moving toward the target position, it is advantageous that he or she may take a walk without normally paying any attention to the position of the GPS receiver.

What is claimed is:

1. A wrist watch type GPS receiver comprising:
 - a GPS receiving antenna configured to be mounted to a user's wrist;
 - antenna posture detecting means for detecting a signal receiving position of the GPS receiving antenna;
 - signal receiving operation controlling means for controlling a signal receiving operation on the basis of an output of the antenna posture detection means;
 - GPS receiving means for receiving a GPS signal by performing a signal receiving operation which is controlled on the basis of an output of the signal receiving operation controlling means;

received GPS wave processing means controlled on the basis of the output of the signal receiving operation controlling means for processing the output signal of the GPS receiving means; and

GPS data display means for displaying GPS data output by the received GPS wave processing means;

wherein the signal receiving operation controlling means includes means for controlling the GPS receiving means not to receive a GPS signal when the output of the antenna posture detecting means indicates that the GPS receiving antenna is not capable of receiving the GPS signal.

2. A wrist watch type GPS receiver according to claim 1; further comprising timer means for counting a predetermined period of time; wherein the timer means is responsive to the antenna posture detecting means for counting the predetermined period of time in response to an output of the antenna posture detecting means indicating that the GPS signal cannot be received by the GPS receiving antenna, and the signal receiving operation controlling means is responsive to the timer means to wait until the predetermined period of time has elapsed to determine whether the GPS receiving antenna is capable of receiving the GPS signal, so that the GPS receiving operation is prevented for the predetermined period of time after detecting that the antenna cannot be received by the GPS receiving antenna.

3. A wrist watch type GPS receiver according to claim 1; further comprising alarm means for issuing an alarm indicating the completion of a GPS receiving operation.

4. A wrist watch type GPS receiver according to claim 1; wherein the GPS receiving antenna is configured to be disposed on a radius bone side of the user's wrist.

✓5. A wrist watch type GPS receiver comprising:

GPS receiving means for receiving a GPS signal;

body movement detecting means for detecting movement of the user's body;

judgment means for judging the movement of the user on the basis of an output signal of the body movement detecting means;

signal receiving operation controlling means for controlling a signal receiving operation of the GPS receiving means based on the judgment result of the judgment means;

moving distance calculating means for calculating a moving distance of the user on the basis of an output signal of the body movement detecting means during a period of time when the GPS signal receiving operation is interrupted; and

alarm means for controlling the GPS receiving means to receive a GPS signal on the basis of an output signal of the moving distance calculating means and for producing an alarm to the user to indicate that the GPS receiving means is capable of receiving the GPS signal.

6. A wrist watch type GPS receiver according to claim 5; further comprising timer means for measuring a moving period of time for the user to move during the period of time when the GPS receiving means is prevented from receiving the wave.

✓7. A GPS receiver comprising: a GPS receiving antenna mountable to a movable support during use of the GPS receiver; a detecting circuit for detecting when the antenna is at a location at which it is capable of detecting a GPS signal; GPS receiving means for receiving the GPS signal; control means for monitoring an output of the detecting

09403339 092999

circuit and controlling the GPS receiving means to receive the GPS signal only when an output of the detecting circuit indicates that the antenna is capable of detecting the GPS signal; GPS processing means for processing an output signal of the GPS receiving means; and GPS data display means for displaying GPS data output by the received GPS wave processing means.

8. A GPS receiver according to claim 7; wherein the control means includes means for controlling the GPS processing means to process the output signal of the GPS receiving means only when the detecting circuit indicates that the antenna is capable of detecting the GPS signal.

9. A GPS receiver according to claim 7; further comprising a housing for mounting the detecting circuit, the GPS receiving means, the control means and the GPS processing means, the housing being wearable on a user's wrist.

10. A GPS receiver according to claim 7; further comprising timer means for counting a predetermined period of time, the timer means being responsive to the detecting circuit for counting the predetermined period of time in response to an output of the detecting circuit indicating that the GPS signal cannot be received by the antenna, and the control means being responsive to the timer means to wait until the predetermined period of time has elapsed to monitor the output of the detecting circuit to determine whether the antenna is capable of receiving the GPS signal, so that the GPS receiving operation is prevented for the predetermined period of time after detecting that the antenna cannot be received by the antenna.

11. A GPS receiver according to claim 10; wherein the control means, the GPS processing means and the timer means comprise a programmed CPU.

12. A GPS receiver according to claim 7; further comprising means for issuing an alarm indicating the completion of a GPS receiving operation.

13. A GPS receiver according to claim 7; wherein the GPS receiving antenna is configured to be mounted on a radius bone side of a user's wrist.

14. A GPS receiver according to claim 7; wherein the antenna is mountable on a user's body; and further comprising body movement detecting means for detecting movement of the user's body; movement judgment means for determining whether the movement of the user's body indicates walking or running on the basis of an output signal of the body movement detecting means; and moving distance calculating means for calculating a moving distance of the user on the basis of an output signal of the body movement detecting means during a period of time when the GPS signal receiving operation is interrupted; wherein the control means includes means for controlling the GPS receiving means to receive the GPS signal only when an output of the movement judgment means indicates that the user is not walking or running.

15. A GPS receiver according to claim 14; further comprising alarm means for producing an alarm on the basis of an output signal of the moving distance calculating means and an output signal of the detecting circuit for indicating that the antenna is capable of receiving the GPS signal.

16. A GPS receiver according to claim 15; further comprising timer means for measuring a time for the user to move during the period of time when the GPS receiving means is prevented from receiving the GPS signal.

17. A GPS receiver according to claim 7; further comprising display means for displaying at least one of position information and speed information based upon an output of the GPS signal receiving means.

* * * * *

00403339-02999
666260-6380460